

What is claimed is:

1. A magnetically navigable catheter for delivering medical treatment to a particular part of the body, the catheter comprising:
  - 5 a sheath having a proximal end and a distal end;
  - an extension member having a proximal end and a distal end, the extension member being slidably mounted in the sheath so that the distal end portion of the extension member telescopes from the distal end of the sheath, the distal end portion of the extension member being relatively more flexible than the distal end of the sheath; and
  - 10 at least one magnet on the distal end portion of the extension member to allow the distal end of extension member to be oriented by the application of an externally applied magnetic field.
2. The catheter according to claim 1 wherein there are a plurality of magnets on the distal end portion of the extension member.
3. The catheter according to claim 1 further comprising at least one electrode on the distal end of the extension member.
4. The catheter according to claim 3 wherein there is a first electrode on the distal end of the extension member, and a second electrode on the distal end portion of the extension member, proximal to first electrode.
5. The catheter according to claim 3 wherein there are two electrodes on the distal end of the extension member, electrically insulated from each other.

6. The catheter according to claim 1 wherein the distal end portion of the extension member comprises a hollow flexible tube, and wherein there are a plurality of magnets disposed in the hollow tube.

7. The catheter according to claim 6 wherein the plurality of magnets are adjacent to each other in the extension member, held together by mutual magnetic attraction.

8. The catheter according to claim 1 further comprising a sleeve, having a proximal end and a distal end, the sleeve being slidably mounted in the sheath so that the distal end portion of the sleeve telescopes from the distal end of the sheath, so that the sleeve can be selectively extended and retracted relative to the sheath, and wherein 5 the extension member is slidably mounted in the sleeve in the sheath and can be selectively extended and retracted relative to the sleeve.

9. A method of navigating the distal end of a catheter within the body into contact with

specific body structures, the method comprising:

providing a magnetically navigable catheter comprising a sheath having a proximal 5 end and a distal end, an extension member having a proximal end and a distal end, the extension member being slidably mounted in the sheath so that the distal end portion of the extension member telescopes from the distal end of the sheath, the distal end portion of the extension member being relatively more flexible than the distal end of the sheath; and at least one magnet on the distal end portion of the 10 extension member;

introducing the distal end of the magnetically navigable electrode catheter into the part of the body where the distal end will be used to contact the specific body structures;

15 moving the distal end into contact with a body structure by applying an external magnetic field and selectively telescoping extension member relative to the sheath to

bring the electrode on the distal end of the extension member into contact with the specific body structure.

10. The method according to claim 9 wherein the catheter comprises an electrode on the distal end of the extension member, and wherein the step of moving the distal end into contact with a body structure comprises moving the electrode into contact with the body structure.

11. The method according to claim 9 wherein the magnetically navigable catheter further comprises a sleeve having a proximal end and a distal end, the sleeve being slidably mounted in the sheath so that the distal end portion of the sleeve telescopes from the distal end of the sheath, and the extension member being slidably mounted in the sleeve in the sheath, and wherein the step of moving the electrode into contact with the body includes selectively telescoping the extension member relative to the sleeve and the sleeve relative to the sheath.

5

12. An magnetically navigable electrode catheter comprising:

- a sheath having a proximal end and a distal end;
- a sleeve having a proximal end and a distal end, the sleeve being slidably mounted in the sheath so that the distal end portion of the sleeve telescopes from the distal end of the sheath;
- 5 an extension member having a proximal end and a distal end, the extension member being slidably mounted in the sleeve so that the distal end portion telescopes from the distal end of the sleeve, the distal end portion of the extension member being relatively more flexible than the distal end of the sleeve;
- 10 at least one electrode on the distal end of the extension member; and
- at least one magnet on the distal end portion of the extension member to allow the distal end of extension member to be oriented by the application of an externally applied magnetic field.

13. The electrode catheter according to claim 12 wherein there are a plurality of magnets on the distal end portion of the extension member.

14. The electrode catheter according to claim 12 wherein there is a first electrode on the distal end of the extension member, and a second electrode on the distal end portion of the extension member, proximal to first electrode.

15. The electrode catheter according to claim 12 wherein there are two electrodes on the distal end of the extension member, electrically insulated from each other.

16. The electrode catheter according to claim 12 wherein the distal end portion of the extension member comprises a hollow flexible tube, and wherein there are a plurality of magnets disposed in the hollow tube.

17. The electrode catheter according to claim 16 wherein the plurality of magnets are relatively closely spaced within hollow flexible tube, but are spaced proximally from the at least one electrode on the distal end to form a flex point in the extension member between the magnets and the at least one electrode.

18. The electrode catheter according to claim 16 wherein the plurality of magnets are relatively closely spaced within the hollow flexible tube, and wherein the tube can telescope out of the sleeve beyond the most proximal of the magnets, to form a flex point in the extension member between the magnets and the sleeve.

19. A method of mapping the electrical characteristics of the left atrium of the heart comprising:

providing a magnetically navigable electrode catheter comprising a sleeve having a proximal end and a distal end, an extension member having a proximal end and a distal end, the extension member being slidably mounted in the sleeve so that the distal end portion telescopes from the distal end of the sleeve, the distal end portion of the extension member being relatively more flexible than the distal end of the sleeve;

5 at least one electrode on the distal end of the extension member; and at least one magnet on the distal end portion of the extension member;

10 introducing the distal end of the magnetically navigable electrode catheter into left atrium;

moving the electrode into contact with a selected point on the surface of the left atrium by applying an external magnetic field and selectively telescoping extension member relative to the sleeve to bring the electrode on the distal end of the extension

15 member into contact with the specific point on the surface of the left atrium;

measuring the electrical characteristics of the left atrium between the electrodes.

20. The method according to claim 19 wherein the magnetically navigable electrode catheter further comprises a sheath having a proximal end and a distal end, the sleeve being slidably mounted in the sheath so that the distal end portion of the sleeve telescopes from the distal end of the sheath, and wherein the step of moving the

5 electrode into contact with a selected point on the surface of the left atrium includes selectively telescoping the sleeve relative to the sheath.

21. A method of therapeutically ablating tissue in the left atrium of the heart comprising:

providing a magnetically navigable electrode catheter comprising a sleeve having a proximal end and a distal end, an extension member having a proximal end and a distal end, the extension member being slidably mounted in the sleeve so that the distal end portion telescopes from the distal end of the sleeve, the distal end portion of the extension member being relatively more flexible than the distal end of the sleeve;

5

at least one electrode on the distal end of the extension member; and at least one magnet on the distal end portion of the extension member;

10 introducing the distal end of the magnetically navigable electrode catheter into left atrium;

moving the electrode into contact with a selected point on the surface of the left atrium by applying an external magnetic field and selectively telescoping extension member relative to the sleeve to bring the electrode on the distal end of the extension member into contact with the specific point on the surface of the left atrium; and

15 applying an RF signal to the tissue in contact with the electrode to ablate the tissue.

22. The method according to claim 21 wherein the magnetically navigable electrode catheter further comprises a sheath having a proximal end and a distal end, the sleeve being slidably mounted in the sheath so that the distal end portion of the sleeve telescopes from the distal end of the sheath, and wherein the step of moving the 5 electrode into contact with a selected point on the surface of the left atrium includes selectively telescoping the sleeve relative to the sheath.

23. The method according to claim 9 wherein the extension member has a lumen extending at least partly therethrough, the method comprising inserting a stylette into the lumen in the extension member to stiffen the extension member.

24. The method according to claim 9 wherein the extension member has a lumen extending at least partly therethrough, the method comprising inserting a pre-shaped stylette into the lumen in the extension member to shape the extension member to facilitate navigation of the extension member.

25. The method according to claim 9 wherein the extension member has a lumen extending at least partly therethrough, the method comprising inserting a

stylette into the lumen in the extension member and pushing the stylette to push the extension member.

26. The method according to claim 19 wherein the extension member has a lumen extending at least partly therethrough, the method comprising inserting a stylette into the lumen in the extension member to stiffen the extension member.

27. The method according to claim 19 wherein the extension member has a lumen extending at least partly therethrough, the method comprising inserting a pre-shaped stylette into the lumen in the extension member to shape the extension member to facilitate navigation of the extension member.

28. The method according to claim 19 wherein the extension member has a lumen extending at least partly therethrough, the method comprising inserting a stylette into the lumen in the extension member and pushing the stylette to push the extension member.

29. The method according to claim 21 wherein the extension member has a lumen extending at least partly therethrough, the method comprising inserting a stylette into the lumen in the extension member to stiffen the extension member.

30. The method according to claim 21 wherein the extension member has a lumen extending at least partly therethrough, the method comprising inserting a pre-shaped stylette into the lumen in the extension member to shape the extension member to facilitate navigation of the extension member.

31. The method according to claim 21 wherein the extension member has a lumen extending at least partly therethrough, the method comprising inserting a

stylette into the lumen in the extension member and pushing the stylette to push the extension member.